forming a second insulating layer over said conductive plug and said first insulating layer;

forming a second contact opening in said second insulating layer;

forming a barrier layer in said second contact opening;

forming a copper conductor over said barrier layer; and

forming a heat-radiating layer on an upper surface portion of said copper conductor, said heat-radiating layer comprising a continuous layer of aluminum nitride passifying said upper surface portion of said copper conductor.

23. (original) The method of claim 22 further comprising the step of chemical mechanical polishing said copper layer and said barrier layer.

24. (original) The method of claim 22 further comprising the step of cleaning said upper surface portion of said copper conductor prior to the formation of said aluminum nitride layer.

25. (original) The method of claim 22, wherein said aluminum nitride layer is formed by deposition, to a thickness of approximately 300 Å.

26. (original) The method of claim 22, wherein said step of forming said aluminum nitride layer includes a deposition process.

27. (original) The method of claim 22, wherein said step of forming said aluminum nitride layer includes a sputtering process.

28. (original) The method of claim 22, wherein said barrier layer is formed of a refractory metal compound, said refractory metal compound being selected from the group consisting of refractory metal nitrides, refractory metal carbides, and refractory metal borides.

29. (currently amended) A method of forming an interconnect structure providing electrical connection ~~in~~ for a semiconductor device comprising:

forming a contact opening in an insulating layer of said device;

depositing a conductor within said contact opening; and

forming a heat-radiating layer comprising aluminum nitride on an upper surface portion of said conductor, said aluminum nitride layer providing a heat dissipating path for said conductor.

30. (original) The method of claim 29 further comprising the step of depositing a barrier layer in said contact opening and before said step of depositing said conductor.

31. (original) The method of claim 29 further comprising the step of cleaning said upper surface portion of said conductor prior to the formation of said aluminum nitride layer.

32. (original) The method of claim 29, wherein said aluminum nitride layer is formed by deposition, to a thickness of approximately 300 Å.

33. (original) The method of claim 29, wherein said step of forming said aluminum nitride layer includes a deposition process.

34. (original) The method of claim 29, wherein said step of forming said aluminum nitride layer includes a sputtering process.

35. (original) The method of claim 29, wherein said conductor is selected from the group consisting of aluminum, gold, silver, tungsten, and copper.

Claims 36-57 canceled.

58. (new) A method of forming a copper interconnect structure providing electrical connection for a semiconductor device, comprising the steps of:

forming a first contact opening into a first insulating layer formed over a semiconductor substrate;

forming a conductive plug in said first contact opening;

forming a second insulating layer over said conductive plug and said first insulating layer;

forming a second contact opening in said second insulating layer;

forming a barrier layer in said second contact opening;

forming a copper conductor over said barrier layer; and

forming a heat-radiating layer on an upper surface portion of said copper conductor, said heat-radiating layer comprising a single continuous layer of aluminum nitride passifying said upper surface portion of said copper conductor.

59. (new) A method of forming an interconnect structure providing electrical connection for a semiconductor device comprising:

forming a contact opening in an insulating layer of said device;

depositing a conductor within said contact opening; and

forming a heat-radiating layer comprising aluminum nitride on an upper surface portion of said conductor, said aluminum nitride layer providing a heat dissipating path for said conductor, wherein said aluminum nitride layer is formed to be from approximately 100 Å to approximately 1000 Å thick. .